

**THE SPECIES OF THE GENUS HERBERTIA HOWARD**

(HYMENOPTERA, PTEROMALIDAE)

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The genus *Herbertia*, having the gaster sessile, the parapsidal furrows complete, the antennae inserted very low on the frons, the head non-menisciform, and the prepectus large, is referable to the tribe Pirenini of the subfamily Pteromalinae. All the species of *Herbertia* are small, the largest known species being only 2.5 mm. long. These species, as far as is known, parasitize leaf-mining Diptera belonging to the family Agromyzidae.

The first described species of *Herbertia* was from the island of St. Vincent, B. W. I. Ashmead soon added 2 more species from Brazil. This paper describes 3 additional species, one each from Japan, India, and the United States.

**Genus *Herbertia* Howard**

*Herbertia* Howard, 1894, Linn. Soc. London Jour. Zool., 25: 98; Dalla Torre, 1898, Cat. Hym., v. 5, p. 216; Ashmead, 1904, Carnegie Mus. Mem., 1: 272, 377; Schmiedeknecht, 1909, Gen. Ins., fasc. 97, p. 270, 271; Gahan and Fagan, 1923, U. S. Natl. Mus. Bul. 124, p. 70; Ferrière, 1934, Schweiz. Ent. Ges. Mitt., 16: 84, 86, 88.

Type: *Herbertia lucens* Howard; monotypic.

This genus was named for Herbert H. Smith, the collector of the type species.

*Generic description*.—Head as broad as or slightly broader than pronotum, from dorsal aspect head approximately half as long as wide, occiput deeply concave, its margin broadly rounded; eyes large, densely hairy; malar space narrow, malar suture absent; ventral margin of gena projecting as a narrow shelf which extends over base of forceps; clypeus a distinct, transverse sclerite; antennae inserted very low, near the clypeal margin; antennal scape short, its apex never exceeding a point half-way between mouth border and anterior ocellus; pedicel stout, almost as long as club; one ring segment present; funicle with 6 segments, all broader than long and usually increasing in width toward apex of funicle; club with 3 segments, club at least half as long as funicle; ocelli large; scrobe cavity with margin non-acute, scrobe occupying more than half the space on frons between the compound eyes. Thorax compact, flattened dorsally, mesopraescutum and scutellum with dorsal surfaces almost on the same plane; pronotum semi-rectangular, transverse, its posterior margin almost straight; parapsidal furrows complete, distinctly impressed throughout; mesoscutellum slightly longer on meson than praescutum; forewing with mar-

ginal and submarginal veins subequal in length, postmarginal vein from  $\frac{1}{3}$  to  $\frac{1}{2}$  as long as marginal, stigmal vein short, its apex bearing a minute spur which usually is directed obliquely anteriorly; hind tibia with 2 apical spurs, one much longer than the other; ventral side of hind tarsus bearing 2 rows of short, relatively weak spines. Propodeum with a median, longitudinal carina and a pair of sublateral, longitudinal carinae, transverse carinae usually also present between median and sublateral ones; median carina usually bearing a minute papilla near its middle; apex of propodeum usually produced on meson as a small neck, dorsal surface of this neck flattened; gaster sessile, first tergum occupying approximately  $\frac{1}{2}$  dorsal length of gaster; first tergum smooth and shining, posterior terga sculptured, dull; apices of ovipositor sheaths usually slightly exerted.

Head, dorsum of thorax, legs, wings, lateral and apical areas of propodeum, base of first gastral tergum, and apical gastral terga conspicuously hairy, the hair on propodeum and base of first gastral tergum woolly. All tibiae and basal 4 segments of all tarsi in all species white; head, body, and legs otherwise black or metallic green, blue, or blue-green.

Antigeny in this genus slight, but males have gaster slightly smaller than females, male first gastral tergum relatively shorter, and apex of gaster produced on meson as a minute point.

#### KEY TO SPECIES OF HERBERTIA

1. Surface of propodeum between carinae shagreened, dull **howardi** Ashmead  
 Surface of propodeum between carinae smooth, shining ..... 2
2. First gastral tergum with a median, transverse, basal lamina ..... 3  
 First gastral tergum without a median, basal lamina ..... 4
3. Median area of scutellum smooth, shining; height of compound eye 5 times as great as width of malar space; longer spur of hind tibia almost as long as basal hind tarsal segment; overall length more than 2 mm.  
 ..... **nipponica**, new species  
 Median area of scutellum reticulated, dull; height of compound eye 6 times as great as width of malar space; longer spur of hind tibia  $\frac{1}{2}$  as long as basal hind tarsal segment; overall length less than 2 mm.  
 ..... **indica**, new species
4. Head, entire thorax, and basal gastral tergum metallic brassy-green, apical gastral terga metallic blue ..... **lucens** Howard  
 Head black, or black with frons metallic blue; mesoscutum metallic blue or dark blue-green, scutellum black ..... 5
5. Fronto-vertex of head bright metallic blue; dorsal margin of clypeus almost touching ventral margin of scrobe cavity; femoral furrow in mesopleuron sculptured ..... **brasiliensis** Ashmead  
 Fronto-vertex black or very faintly tinted with metallic blue; dorsal margin of clypeus separated from margin of scrobe cavity by a space greater than length of clypeus; entire mesopleuron smooth .....  
 ..... **wallacei**, new species

***Herbertia howardi* Ashmead**

*Herbertia howardi* Ashmead, 1904, Carnegie Mus. Mem., 1: 474; Schmiedeknecht, 1909, Gen. Ins., fasc. 97, p. 271; Ferrière, 1934, Schweiz. Ent. Ges. Mitt., 16: 88.

*Female*.—Length 2.5 mm. Head with frons metallic blue, vertex and occiput black; antennae brown, faintly washed with metallic blue sheen; pronotum black, narrow transverse band at posterior margin metallic blue; mesopraescutum, parapsides, and axillae metallic blue-green; scutellum metallic blue-green laterally, shading to black on meson; thorax on pleura and venter shining black, faintly tinged with metallic blue from some angles; coxae black, femora metallic blue-green; wing veins tan; propodeum black, tinged with blue-green near spiracles; first gastral tergum metallic green at base, shading to black at apex, posterior gastral terga black.

Compound eye extremely large, width of malar space only  $1/12$  as great as height of eye; antennae inserted at level of ventral margins of eyes; antennal club as long as 3 apical funicle segments, pedicel as long as 3 basal funicle segments; ventral margin of scrobe cavity almost in contact with clypeus; scrobe cavity extending to a point slightly below half the eye height; width of frons at level of apex of scrobe cavity  $1\frac{1}{2}$  times as great as width of compound eye; width of anterior ocellus  $1/6$  as great as interocular distance at this point.

Entire dorsum of thorax with minute but strong alveolate sculpture, nowhere smooth; prepectus with surface anteriorly roughened, mat, posteriorly smooth and shining; mesopleuron mostly smooth, but with a large, diamond-shaped, sculptured area at antero-ventral angle and a smaller, depressed, sculptured area near base of hindwing; forewing with marginal vein twice as long as postmarginal, stigmal  $1/3$  as long as postmarginal.

Surface of propodeum between carinae dull, shagreened; median propodeal carina with a papilla, a pair of transverse carinae arising from median one just posterior to papilla, lateral carinae stout and strongly elevated; spiracle oval, margins elevated, touching anterior propodeal margin; basal margin of first gastral tergum without a transverse lamina; first gastral tergum occupying slightly less than  $1/2$  dorsal length of gaster; ovipositor sheaths not exerted.

*Male*.—Unknown.

*Type locality*.—Rio de Janeiro, Brazil.

*Type*.—U. S. N. M. no. 60515 (formerly in the Carnegie Museum, Pittsburgh, Pa.).

*Distribution*.—Brazil.

*Host*.—Unknown.

***Herbertia nipponica*, new species**

*Female*.—Length 1.5 mm. Shining, jet black, with frons, antennae, posterior margin of pronotum, tegulae, coxae, and femora faintly metallic blue; wing veins tan.

Width of malar space  $1/5$  as great as height of compound eye; dorsal margin of clypeus well separated from ventral margin of scrobe cavity; antennae inserted at level of ventral margins of compound eyes; antennal club as long as apical 3 funicle segments; pedicel as long as 2 apical funicle segments; scrobe

cavity extending to  $\frac{1}{2}$  the eye-height; width of frons at level of apex of scrobe cavity twice as great as width of one compound eye.

Entire mesopleuron smooth and shining; forewing with postmarginal vein  $\frac{2}{5}$  as long as marginal, stigmal slightly less than  $\frac{1}{2}$  as long as postmarginal; surface of scutellum reticulated at base, surface smooth in middle and apical part; longer apical spur of hind tibia almost as long as basal segment of hind tarsus.

Surface of propodeum smooth, shining; median carina without a papilla, transverse carinae lacking; spiracles oval, touching anterior margin of propodeum; anterior margin of basal gastral tergum with a short, median, transverse lamina; laterally at base this tergum with dense, woolly hairs; first gastral tergum occupying  $\frac{5}{8}$  dorsal surface of gaster; apices of ovipositor sheaths slightly projecting.

*Male*.—Unknown.

*Type locality*.—Japan.

*Type*.—U. S. N. M. no. 64494.

Described from 1 female specimen reared at the Seattle, Washington, Port of Entry, Feb. 29, 1934, from *Euonymus* sp. leaf from Japan infested with an undetermined agromyzid leaf miner, J. P. Young, Seattle no. 3641.

#### *Herbertia indica*, new species

*Female*.—Length 1.2–1.5 mm. Head, thorax, and abdomen usually entirely black; antennae and wing veins tan; tegulae, coxae, femora, and propodeum faintly metallic blue or blue-green; posterior margin of pronotum sometimes metallic blue; vertex and entire dorsum of body sometimes with a very faint metallic blue sheen.

Width of malar space  $\frac{1}{6}$  as great as height of compound eye; dorsal margin of clypeus almost touching ventral margin of scrobe cavity; antennae inserted slightly above level of ventral margins of compound eyes; antennal club pointed at apex, as long as apical 3 funicle segments, pedicel  $\frac{5}{8}$  as long as club; scrobe cavity extending to  $\frac{3}{4}$  the eye height; width of frons at level of apex of scrobe cavity twice as great as width of a compound eye.

Entire mesopleuron smooth, shining; apex of scutellum smooth, rest of thoracic notum sculptured; forewing with marginal vein slightly greater than twice as long as postmarginal, stigmal vein  $\frac{1}{2}$  as long as postmarginal; longer spur of hind tibia  $\frac{1}{2}$  as long as basal hind tarsal segment.

Surface of propodeum between carinae smooth; papilla present on median propodeal carina, located very near base of propodeum; transverse carinae absent; spiracles oval, almost touching anterior propodeal margin; basal gastral tergum with median, transverse lamina at base; first tergum making up  $\frac{3}{5}$  dorsal length of gaster; apices of ovipositor sheaths projecting a distance equal to dorsal length of third gastral tergum.

*Male*.—Length 1.1–1.4 mm. Thoracic notum more strongly flattened than in female; first gastral tergum comprising  $\frac{2}{3}$  to  $\frac{3}{4}$  dorsal length of gaster.

*Type locality*.—Gwalior, India.

*Types*.—U. S. N. M. no. 64495.

Described from 5 female and 5 male specimens, as follows: Holotype ♀, allotype ♂, and 2 ♀ and ♂ paratypes, Gwalior, Madhya Pradesh, India, 1958, reared from dipterous leaf miner on *Withania seminigera*, O. S. Bindra; 2 ♂ paratypes, same data, but from *Lirio-myza* sp. leaf miner on undetermined herbaceous weed; 2 ♀ and 1 ♂ paratypes, Paradeniya, Ceylon, May 3, 1914, reared from dipterous leaf miner, A. Rutherford.

#### *Herbertia lucens* Howard

*Herbertia lucens* Howard, 1894, Linn. Soc. London Jour. Zool., 25: 98; Dalla Torre, 1898, Cat. Hym., v. 5, p. 216; Ashmead, 1900, Ent. Soc. London Trans., [48]: 255; Schmiedeknecht, 1909, Gen. Ins., fasc. 97, p. 271; Ferrière, 1934, Schweiz. Ent. Ges. Mitt., 16: 88, 93.

*Female*.—Length 1.8 mm. Head, thorax, coxae, trochanters, femora, and basal gastral tergum shining, metallic green; propodeum black with metallic blue highlights; antennae, tegulae, and apical gastral segments metallic blue; wing veins tan.

Width of malar space  $1/6$  as great as height of compound eye; antennae inserted slightly below level of ventral margins of compound eyes; margin of clypeus almost in contact with ventral margin of scrobe cavity; antennal club as long as apical 3 funicle segments, pedicel as long as 3 basal funicle segments; apex of scrobe cavity located at a point  $1/2$  the eye height; width of frons at level of apex of scrobe cavity  $1\frac{1}{2}$  times as great as width of a compound eye; width of anterior ocellus  $1/5$  as great as interocular distance at this point.

Prepectus and entire mesopleuron smooth and shining; forewing with marginal vein twice as long as postmarginal, stigmal vein  $2/5$  as long as postmarginal; entire surface of scutellum reticulated; longer hind tibial spur  $1/3$  as long as basal segment of hind tarsus.

Surface of propodeum between carinae smooth, shining, median carina with a papilla at base, no transverse carinae arising at this point; spiracles oval, touching anterior margin of propodeum; first gastral tergum without a transverse lamina at base;  $1/2$  dorsal length of gaster occupied by first tergum; ovipositor sheaths projecting a distance equal to length of terga 2-4.

*Male*.—Length 1.25 mm. First gastral tergum occupying slightly less than  $1/2$  dorsal length of gaster; seventh tergum produced at apex as a minute point.

*Type locality*.—St. Vincent, B. W. I.

*Types*.—Originally described from 14 cotypes; there are now 4 in the U. S. National Museum (no. 2727), and 8 in the British Museum (Natural History); 2 specimens presumably are lost.

*Distribution*.—St. Vincent, B. W. I.

*Host*.—Unknown.

#### *Herbertia brasiliensis* Ashmead

*Herbertia brasiliensis* Ashmead, 1904, Carnegie Mus. Mem., 1: 474; Schmiedeknecht, 1909, Gen. Ins., fasc. 97, p. 271; Ferrière, 1934, Schweiz. Ent. Ges. Mitt., 16: 88.

*Female*.—Length 1.75 mm. Head with fronto-vertex intense metallic blue, occiput black; antennae brown, washed with metallic blue-green; pronotum

black, posterior margin metallic blue; mesoseutum metallic blue, scutellum black; coxae black, femora metallic blue-green; wing veins brown; propodeum black on meson, blue-green laterally; dorsal surface of first gastral tergum metallic blue, apical terga black.

Width of malar space  $1/5$  as great as height of compound eye; clypeus bearing a row of 4 bristles along its anterior margin, clypeal margin almost in contact with ventral margin of scrobe cavity; antennae inserted at level of ventral margins of compound eyes; antennal club as long as apical 3 funicle segments, pedicel as long as apical 2 funicles; scrobe cavity extending to  $2/3$  the eye height; width of frons at level of apex of scrobe  $1\frac{1}{3}$  times as wide as eye.

Prepectus smooth; femoral depression of mesopleuron sculptured, mesopleuron otherwise smooth; dorsum of thorax reticulated, scutellum uniformly more strongly sculptured than mesoseutum; forewing with marginal vein slightly more than twice as long as postmarginal, stigmal vein  $\frac{1}{2}$  as long as postmarginal; longer spur of hind tibia  $\frac{1}{2}$  as long as basal hind tarsal segment.

Surface of propodeum between carinae smooth; papilla present on median carina, propodeal spiracles oval, almost touching anterior margin; first gastral tergum making up  $\frac{1}{2}$  dorsal length of gaster; transverse, dorsal lamina wanting at base of first gastral tergum; apex of ovipositor sheaths slightly produced.

*Male*.—Unknown.

*Type locality*.—Chapada, Brazil.

*Type*.—U. S. N. M. no. 60516 (formerly in the Carnegie Museum, Pittsburgh, Pa.).

*Host*.—Unknown.

#### *Herbertia wallacei*, new species

*Female*.—Length 1.25–1.75 mm. Head black, fronto-vertex sometimes with very faint blue luster, antennae dark brown or black, tinged with metallic blue or green; posterior margin of pronotum and most or all of mesoscutum metallic blue or dark blue-green, thorax otherwise black; wing veins brown; tegulae, coxae, and femora metallic blue or blue-green; lateral areas of propodeum with metallic blue or blue-green tint, abdomen otherwise black, although dorsum of first gastral tergum sometimes faintly metallic blue.

Width of malar space  $1/5$  as great as height of compound eye; clypeus well separated from ventral margin of scrobe cavity; antennae inserted slightly below level of ventral margins of compound eyes; antennal club as long as apical 3 funicle segments, pedicel as long as apical 2 funicles; scrobe cavity extending to  $2/3$  the eye height; width of frons at level of apex of scrobe cavity twice as great as width of compound eye.

Prepectus and mesopleuron smooth, shining; dorsum of thorax reticulated except for lateral and apical margins of scutellum, which are smooth; forewing with marginal vein twice as long as postmarginal, stigmal  $\frac{1}{2}$  as long as postmarginal; longer apical spur of hind tibia  $\frac{1}{2}$  as long as basal hind tarsal segment.

Surface of propodeum between carinae smooth; papilla present on median propodeal carina, transverse carinae extending laterally from median carina but not reaching lateral carinae; spiracles oval, almost touching anterior propodeal



margin; median, transverse lamina absent at base of first gastral tergum; two rows of woolly hair present on either side at base of first tergum, this tergum making up  $\frac{1}{2}$  dorsal length of gaster; tips of ovipositor sheaths projecting slightly past end of gaster.

*Male*.—Length 1.0-1.25 mm. Antennae, vertex, posterior margin of pronotum, tegulae, coxae, and femora faintly metallic blue, otherwise black.

*Type locality*.—Norfolk, Va.

*Types*.—U. S. N. M. no. 64496.

Described from 7 female and 2 male specimens, as follows: Holotype ♀, Norfolk, Va., 1926, reared from *Phytomyza ilicicola* Loew, F. W. Poos; allotype ♂ and 1 ♀, 1 ♂ paratypes, Pittsburgh, Pa., South Park, Aug. 11-18, 1939, G. E. Wallace; 1 ♀ paratype, Patuxent Refuge, Md., Aug. 31, 1953, H. Owens; 1 ♀ paratype, Waco, Texas, July 6, 1949, P. A. Glick; 1 ♀ paratype, Waco, Texas, July 13, 1949, on cotton, W. B. Lattimore; 1 ♀ paratype, Brownsville, Texas, July 21, 1945, on cotton; 1 ♀ paratype, Wellston, Ohio, May 25, 1953, W. E. Miller. One ♂ and 1 ♀ paratypes deposited in the Carnegie Museum, Pittsburgh, Pa.; the other specimens are in the U. S. National Museum.

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## A NEW SPECIES OF NOMADOPSIS AND NOTES ON SOME PREVIOUSLY DESCRIBED ONES

(HYMENOPTERA, ANDRENIDAE)

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This paper is based upon collections generously loaned by the California Insect Survey, University of California, Berkeley [CIS], Cornell University [CU], Snow Entomological Museum, University of Kansas [KU], U. S. National Museum [NM], and University of Idaho [UI]. Only records that alter previously existing concepts of the distribution of a species or that greatly extend the known range of a species are listed. Unless indicated otherwise, citations of previous work refer to my revisionary study of the genus (Rozen, 1958).

### *Nomadopsis* (*Nomadopsis*) *puellae* (Cockerell)

1 male, Murphy, Owyhee Co., Ida., VI-16-57 (W. F. Barr). 2 males, same except 13 mi. S.E. of Murphy, V-27-58 [All UI]

After the revision of the genus was completed, the distribution of *puellae* north of southern Nevada still remained in doubt. However, the above records suggest that the species inhabits most of the Great Basin region. Accordingly *puellae* will probably be collected in southern Oregon and western Nevada.